National Institute of Environmental Health Sciences

Effects of heating season on residential indoor and outdoor polycyclic aromatic hydrocarbons, black carbon, and particulate matter in an urban birth cohort

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Abstract:

Exposure to air pollutants has been associated with adverse health effects. However, analyses of the effects of season and ambient parameters such as ozone have not been fully conducted. Residential indoor and outdoor air levels of polycyclic aromatic hydrocarbons (PAH), black carbon (measured as absorption coefficient [Abs]), and fine particulate matter <2.5μm (PM) 2.5 were measured over two-weeks in a cohort of 5-6 year old children (nEuro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin)334) living in New York City's Northern Manhattan and the Bronx between October 2005 and April 2010. The objectives were to: 1) characterize seasonal changes in indoor and outdoor levels and indoor/outdoor (I/O) ratios of PAH (gas + particulate phase; dichotomized into ∑ 8PAH semivolatile (MW 178-206), and ∑ 8PAH nonvolatile (MW 228-278)), Abs, and PM 2.5; and 2) assess the relationship between PAH and ozone. Results showed that heating compared to nonheating season was associated with greater ∑ 8PAH nonvolatile ($p<0.001$) and Abs ($p<0.05$), and lower levels of ∑ 8PAH semivolatile ($p<0.001$). In addition, the heating season was associated with lower I/O ratios of ∑ 8PAH nonvolatile and higher I/O ratios of ∑ 8PAH semivolatile ($p<0.001$) compared to the nonheating season. In outdoor air, ∑ 8PAH nonvolatile was correlated negatively with community-wide ozone concentration ($p<0.001$). Seasonal changes in emission sources, air exchanges, meteorological conditions and photochemical/chemical degradation reactions are discussed in relationship to the observed seasonal trends. © 2010 Elsevier Ltd.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Indoor Environment, Temperature

Air Pollution: Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): PAH; black carbon

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified